STANDARD FORM NO. 64

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Office Memorandum • UNITED STATES GOVERNMENT

TO : The Files

DATE: 14 May 1957

FROM [redacted] 25X1

RD 85

SUBJECT: Trip Report - RS-11A/B/C [redacted] 25X1

1. General - The [redacted], 25X1
[redacted] was scheduled to deliver six RS-11/series 25X1
units on 1 May 1957 and the balance of the deliverable items prior to 1 June 1957. The contractor phoned on 1 May to advise that technical difficulties were being encountered with the RT-11B transmitter and technical assistance was requested in accordance with a prior agreement. A visit was made to the contractor's plant during 6-7 May for this purpose. The technical difficulties were overcome and improved performance of the RT-11B, as well as the RT-11A and RT-11C, may be expected. Since redesign involves only changing the value of some voltage dropping resistors, the 1 June delivery date is not affected. Present were:

[redacted] 25X1

[redacted] R&D/IP 25X1
R&D/EP

2. Specific Difficulty - RT-11B difficulties concerned low power output when operating on the 3rd harmonic of the crystal fundamental and inability to tune 30 mcs.

3. Tests - Initial work was the accumulation of test data under the supervision of [redacted] who thoughtfully brought along a crystal current meter as well as additional crystals. An analysis of the test data indicated insufficient oscillator drive and excessive minimum capacity at 30 mcs. 25X1

4. Oscillator Drive - The reason for the reduced 3rd harmonic oscillator drive was due to failure on the part of the contractor to compensate for a 20 volt B plus voltage drop lost across a recently added key-click filter. The reduced B plus on the plate of the oscillator resulted in insufficient 3rd harmonic output. This situation was corrected by reducing the value of the 10K oscillator plate voltage dropping resistor to a value adequate to provide 3rd harmonic drive without excessive crystal current. Satisfactory drive was obtained with a 6800 ohm resistor which did not restore the entire 20 volts lost across the key-click filter and it was agreed that this circuit could be optimized with some experimentation with the feed back capacitor value.

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5. 30 mc Tuning - Power output circuitry includes both a parallel and a series filter network for TVI suppression. These filter networks are peaked at 60 mcs. The series network consisting of L and C is connected between the tap of the antenna loading coil and ground. With the aid of a grid-dip meter it was determined that the resonant frequency of the filter was a function of the position of the tap. Since the turns of the antenna coupling network formed a part of the inductance of the filter then the C of the filter was C_{min} for the tank circuit. This was proved by reducing C of the filter to a lesser value and obtaining improved but not satisfactory tuning and power output. Since removing the series filter entirely increases the power output from 3 to 6 watts with sharp tuning, it was decided to determine the worth of the series filter.

6. TVI - Tests have shown that TVI occurs on channel 3 when the second harmonic of the fundamental falls within that band (54 to 60 mcs). The addition of the series filter was said to eliminate this difficulty. However, since the addition of the filter results in a power output reduction of 2 to 3 watts, it was not known whether the TVI reduction was due to filter functioning or the reduced power output. A test was made with a television set running wide open. Interference was observed with the series filter installed and a power output of 3 watts. The filter was then removed and the B plus reduced to yield a 3 watt output. A comparison of the TVI clearly indicated that the TVI reduction at 3 watts is due to a power output reduction rather than to filter functioning. Such a conclusion is logical since 2nd harmonic reduction can be attributed to the parallel 60 mc filter installed in the tank circuit.

7. Comment - It appears that the parallel TVI filter is semi-effective in reducing 2nd harmonic radiation in the TV bands. The addition of the 2nd series filter contributes nothing. Ideal TVI elimination would require a low-band pass filter network which would require an additional black box, and might not even then be successful since under common filter design both the input and output impedances must be constant for maximum effectiveness. With the absence of the series filter, power output may be considered a conservative 7 watts from 3 to 30 mcs and reaches 13 watts with optimum loading and frequency.

8. Contractual Activity - It was agreed that the contractor would make additional tests in the next few days to substantiate our findings along the following lines:

a. To make more extensive tests on optimum resistor value for the A, B, and C transmitters to compensate for the voltage drop across the key-click filter; to monitor the crystal current continuously when making such determinations. To optimize the oscillator feedback capacitor value.

b. To determine the optimum value for the power amplifier screen dropping resistor since the addition of the key-click filter.

c. To experiment with the relocation of the series filter to some point other than the antenna coupling tap. To increase L and reduce C of the series filter to determine tuning feasibility at 30 mcs.

8. Engineering Personnel - Mr. [redacted] has been designated as the project engineer for the project and he is assisted by two junior engineers. Both [redacted] and the undersigned were impressed with [redacted] apparent capability and the mutual desire of both [redacted] to deliver a good product. [redacted] said he would keep Lashever on the RS-11 until delivery was made. The extent of testing desired will in no way delay delivery since the correct resistor values can be installed at the last minute. 25X1 25X1 25X1 25X1

9. Other Business - An RP-11 power supply sample was accepted for prototype tests along with test data and recommendations for minor changes which were discussed in a previous trip report.

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